

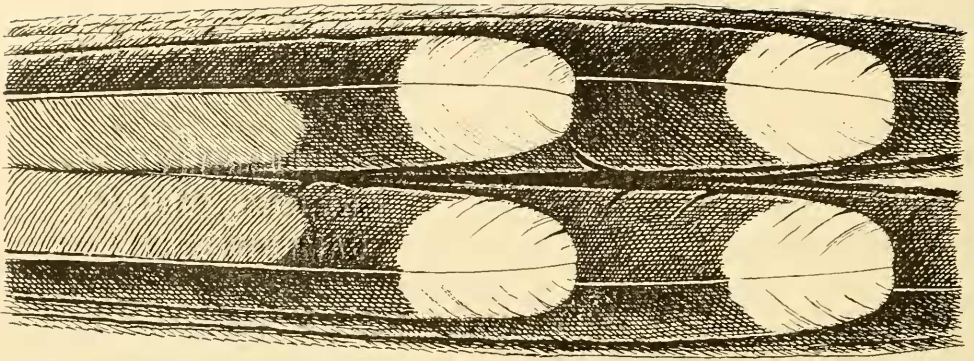
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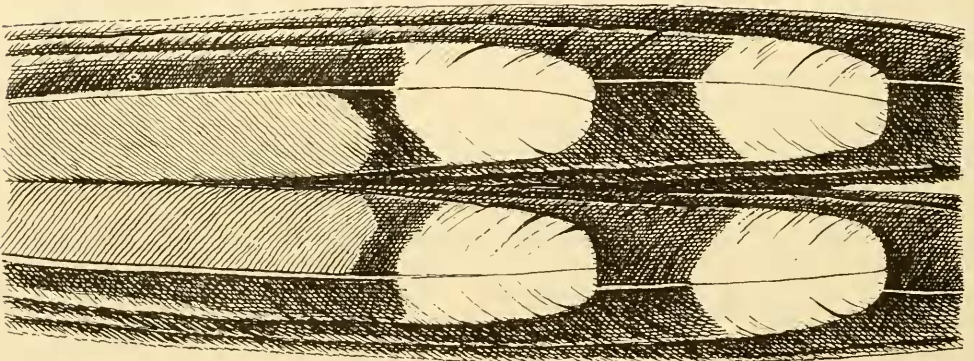
A REVIEW OF THE RACES OF
GEOCOCCYX VELOX

BY
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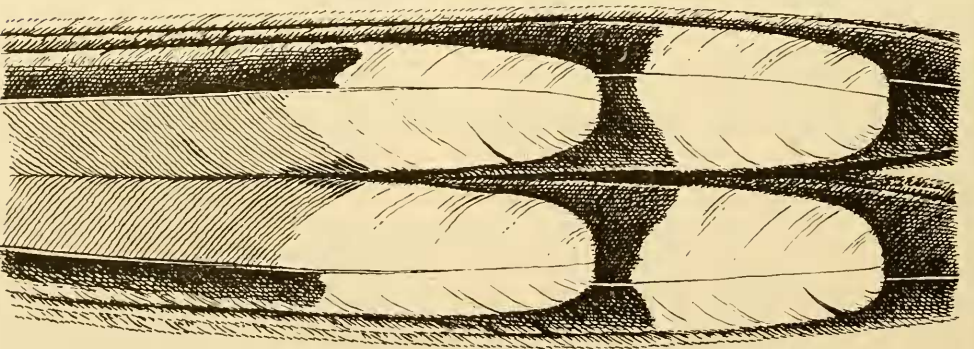
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A



B



C

Fig. 1. Ink drawing by J. L. Ridgway of two outer pairs of rectrices of three races of *Geococcyx velox*. (A) *melanchima*, (B) *affinis* and (C) *longisignum*, all viewed from below.

A REVIEW OF THE RACES OF GEOCOCCYX VELOX

BY

ROBERT T. MOORE

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In preparation for the report on the birds of Sinaloa, one of whose chief objectives is the definition of the faunal areas of the state and their overflow into surrounding territory, I have described several races from extreme southern Sonora and northern Sinaloa. In continuation of this project, I shall publish others from time to time.

Ridgway, in *The Birds of North & Middle America*, recognized only two species of the genus *Geococcyx* Wagner—*Geococcyx californianus* (Lesson) and *Geococcyx affinis* Hartlaub. In his *Addenda*, part 7, p. 502, he accepted Hellmayr's dictum that the Lesser Roadrunner, named by Hartlaub *affinis*, had previously been described by A. Wagner as *Cuculus velox* in 1836, and changed the name of the smaller bird to *Geococcyx velox* (A. Wagner), reducing all previously described races to synonyms. I have assembled a large amount of new material which was not available to Ridgway, namely, an adequate series from Salvador collected by Adriaan van Rossem, a large series from Guatemala taken by A. W. Anthony, eight specimens from Honduras secured by C. F. Underwood and a considerable amount of new specimens from Nicaragua, Oaxaca, Tepic, Sinaloa and Sonora, totaling forty individuals which Ridgway did not have. Examining these, as well as those previously in the possession of the Museum of Comparative Zoölogy, the American Museum of Natural History and the Smithsonian Institution, it is now possible to recognize not only certain stable differences of coloration, but also important characters, apparently not hitherto mentioned in the literature of the subject, which prove uniform in their modifications from one faunal area to another. These latter are chiefly the relative proportions of black, white and gray on the two outer rectrices and the presence or absence of the subterminal black bar on the outer one, which separates the light gray of the basal area of the inner webs from the white tips. In the males of northwestern Mexico this bar averages approximately 20 mm. wide, in Guatemalan and Salvadoran birds 10 mm. wide, whereas

in birds from Honduras and Nicaragua it disappears entirely, or is negligible.

The type of *Cuculus velox* was described in some detail by Hellmayr in *Novitates Zoologicae*, Vol. XX, 1913, p. 253, and recently has been examined by van Rossem. Their reports prove that it is a very dark form similar to the four birds I have examined from Vera Cruz and it undoubtedly came from Mexico City. We, therefore, have four recognizable forms of *velox*:

1. A dark cinnamon-buff bird in east-central Mexico with concolor back and rump, short tips to rectrices and a very wide subterminal black bar on the outer one, to which the name *velox* applies;

2. A pale bird in northwestern Mexico with two-tone back and rump, equally short tips and narrow black bar;

3. In Guatemala and Salvador a buff and rusty bird with much narrower black bar on outer rectrix, much longer white tips to all rectrices and gray appearing on inner web of second rectrix. For this the name *affinis* of Hartlaub applies, since Hartlaub's type undoubtedly came from Guatemala;

4. In Honduras and Nicaragua a form with tendency toward white and black, separated from all other races by disappearance of the black bar on lateral rectrices, much longer tips to all three outer rectrices, and very dark brown upper parts with concealed marks of green. I, therefore, recognize *velox* of eastern Mexico, *affinis* as a race in Guatemala and Salvador, and describe the bird of northwestern Mexico and the Honduras-Nicaraguan form.

Geococcyx velox

Specific characters.—Similar to *Geococcyx californianus* (Lesson), but size smaller; pileum black; upper parts browner, Tawny¹ through Cinnamon Buff to dark greenish brown; foreneck and chest unstreaked medially; under parts of body Light Buff to Cinnamon Buff; under tail-coverts Dusky Drab to Blackish Brown, tipped with Cinnamon Buff. Male, wing 132-154 mm.; tail 250-303 mm.; exposed culmen 32.5-41.9 mm. Female, similar to male, but very slightly smaller. Wing 126.5-149.7 mm.; tail 245-277 mm.; exposed culmen 32.1-40 mm.

¹ Capitalized names of colors in paper taken from Ridgway, *Color Standards and Color Nomenclature*, 1912.

*Geococcyx velox melanchima*² subsp. nov.

PALE ROADRUNNER

Type.—Male adult; no. 4239, collection of Robert T. Moore; Guirocoba, Sonora, Mexico, (altitude 2500 ft.); March 25, 1931; collected by J. T. Wright.

Subspecific characters.—Nearest to *Geococcyx velox velox* (A. Wagner), but buff of under parts much lighter; throat almost white instead of Light Buff to Warm Buff; abdomen whitish and not concolor with rest of underparts; apical spots on feathers of crown and hind-neck whiter; back lighter, Rood's Brown instead of Carob Brown; feathers of rump darker with tips Tawny Olive instead of Russet; and streaks of upper parts lighter.

Description of Type.—Adult male, no. 4239. Feathers of pileum black, each with two subterminal, lateral spots, white to very light buff, the spots more numerous and more truncated on forehead and anterior part of crown; hind-neck and upper back black margined by whitish with subterminal margin of Ochraceous-Tawny; back and scapulars Cinnamon-Brown, the feathers margined with white, creating conspicuous streaks; wing-coverts with broad median streak of black, broadly edged with white, faintly tinged with very pale buff, the greater coverts Vinaceous-Purple medially with bronzy green sheen, broadly edged with whitish or very pale buff; proximal secondaries (tertials) Carob Brown with Dark Vinaceous-Purple sheen, edged with whitish; primary coverts black with faint greenish sheen basally, terminal half white; primaries Clove Brown with wide medial longitudinal blotch on inner web Pallid Brownish Drab, margined by darker, the distal third of outer webs obliquely crossed near middle portion by a broad band of white, the outer webs broadly tipped with white; feathers of rump Clove Brown subterminally grayish at base and tipped with Tawny Olive; upper tail-coverts Buffy Brown to Olive-Brown margined by white; median rectrices Dusky Drab with faint gloss of Vinaceous-Drab, Chaetura Black subterminally, the entire feather edged narrowly on both margins and tipped with white; next pair glossy American Green mottled with glossy Dark Vinaceous-Brown, each feather margined even more narrowly on the sides than the median pair with white, but with larger white tip; outer webs of remaining rectrices from Dusky Dull Green on outer, to Olivaceous Black on third, with faint gloss, margined by white, the inner webs lighter green, more largely tipped with white, the white tip increasing in width to outermost pair, the tips of three outer pairs (beginning with the lateral rectrices) measuring 27.8 mm., 26.2 mm. and 9.1 mm.; under surface of median rectrices Glossy Fuscous, next pair Glossy Fuscous-Black, three lateral rectrices Chaetura Black; the basal three-quarters of inner webs of lateral rectrices above light gray, this separated from white tip by a band of black, 24.7 mm. in length³; right hand feather of second pair of rectrices from outside with very small median area of light gray, left hand without any; lores

² Taken from the Greek noun μελάγχιμα, meaning "dark spots in snow," referring to the appearance of the subterminal black bar, set between the pure white tip and the grayish white web of the outer rectrix.

³ The length of this bar throughout the paper means distance along the shaft and not across the feather, and will hereafter be called "length" and not "width."

white; auricular region streaked with black and whitish; chin, throat and center of abdomen white with only a faint cast of very Light Buff, rest of underparts Light Buff to Warm Buff, darker on chest and thighs; sides of neck and sides of chest white to Light Buff, broadly streaked with black; maxilla dark grayish black above to light gray along the tomium; mandible Pale Dull Gray; unfeathered soft parts about the eye and of the bare orbital space Light to Deep Soft Blue-Violet without any red or orange; iris light hazel; legs Puritan Gray; toes Celandine Green⁴.

Measurements.—Average of 14 adult males, wing 139.6 mm.; tail 269.6 mm.; exposed culmen 38.5 mm.; outer anterior toe minus claw 29.8 mm.⁵; tarsus 49.5 mm. Average of 13 adult females, wing 134.6 mm.; tail 260.8 mm.; exposed culmen 36.3 mm.; outer anterior toe minus claw 29.2 mm.⁶; tarsus 47.7.⁷

Specimens examined.—Twenty-five specimens: Sonora, 1 ♂ and 1 ♀; Sinaloa, 4 ♂ and 3 ♀; Tepic, 1 ♀; Jalisco, 3 ♂ and 1 ♀; Colima, 1 ♂ and 1 ♀; Guerrero, 1 ♂ and 2 ♀; Oaxaca, 4 ♂ and 2 ♀.

Range.—Arid Tropical Zone from southern Sonora to Colima and probably to Oaxaca.

Remarks.—This form differs from *affinis* in having the white tips to three outer pairs of rectrices much shorter (see Table of Measurements); subterminal black bar of outer rectrix much longer; no gray on second rectrix of specimens examined; upper back averaging lighter in series; their bases as well as those of scapulars less green. The relationship with the Honduran form will be discussed under that race.

Smallest of all the races, with the exception of the birds of Yucutan, *melanchima* frequents the cactus and mesquite association, following it from sea level into the oaks, wherever open conditions may be found, to approximately 3000 feet. Whether its pallid body tones may be correlated with hot desert conditions, it seems likely that the excess proportion of black in its rectrices finds its source in deeper biological processes. As a species it is not confined to desert conditions, but is found in open spaces among the pines at higher altitudes. It reaches 4500 feet in La Balla Mountains of southern Sinaloa and 8000 feet in the Wakenakili Mountains of Jalisco. All specimens examined from these higher elevations show darker coloration above and below and larger size, approaching *velox*, whose type came from an elevation of 7500 to 8000 feet. There is some individual variation, but these birds I classify as incipient intergrades, but nearer *melanchima*. They retain the long black bar on second rectrix and the short white tip characteristic of both *melanchima* and *velox*. It is highly probable that a good series from eastern Jalisco, Michoacan, and Puebla will produce more definite intergrades with *velox*.

⁴ These colors are taken from a painting made in the field by Mrs. J. T. Wright.

⁵ Nine specimens. Measured from anterior margin of last undivided scute.

⁶ Five specimens.

⁷ Seven specimens. For measurements of markings on rectrices for all races see table at end of paper.

Geococcyx velox velox (A. Wagner)

LESSER ROADRUNNER

Cuculus velox A. WAGNER, Münchener Gelehrte Anzeigen, iii, p. 95, (July 1836.—Mexico; Karwinski Coll.).

Type.—In the Zoological Museum, Munich: ad., Mexico—Karwinski Coll. Type of *Cuculus velox* A. Wagner.

Measurements of Type.—“Wing, 138; Tail, 275; Culmen (tip broken); Tarsus, 50; Middle Toe minus Claw, 29; Collector Karwinski; no sex; Mexico. No number.”⁸

According to Dr. Hellmayr⁹, “*Cuculus velox* was described by Dr. Andreas Wagner, then Curator of the Zoological Collections at Munich, from an example obtained by Karwinski somewhere near the City of Mexico (exact locality not stated).” He adds, “The underparts are uniform buff, paling into whitish on chin and upper throat; . . . the sides of foreneck and chest only are marked with broad, black shaft-stripes. Above, the crown and nape are black . . . the back . . . is bright rufescent-brown.” Mr. van Rossem has kindly loaned his note regarding his examination. Confirming Hellmayr’s description of the type, he calls it a “very dark colored bird” with “streaks on the chest and neck—black and broad”. He gives in addition the measurements of the white tips of the three outer rectrices, beginning with the lateral first as “30, 15 and 6 mm. respectively . . . third (6 mm. tips) pair are new.” These combined descriptions fit perfectly the Vera Cruz birds I have examined. They are “very dark colored” birds. Furthermore, the small measurements of the white tips to the three outer pairs of rectrices, taken in conjunction with the descriptions, furnish convincing evidence that the Type came from either the state of Vera Cruz or near Mexico City. Of the sixty-six specimens of *velox*, none except the birds of east Mexico and *melanchima* of northwestern Mexico have tips as small as these. However, the dark coloration of the type distinguishes it sharply from the latter. That this “dark” cinnamon coloration is not due to “foxing” is proved by 18 specimens of *melanchima* and *affinis*, collected by Sumichrast 1868, Llarregin 1864, Schott 1864, Gaumer 1880, Brown 1889, Batty 1904, Xantus and Grayson, which have retained the lighter coloration of these two races. Finally, the ordinary measurements of the Type, covering wing, tail, and culmen are almost identical with the average of the Vera Cruz specimens. I, therefore, believe it reasonable to accept Hellmayr’s statement that the type was obtained “somewhere near the City of Mexico” and I herewith suggest the outskirts of Mexico City as the type locality.

Subspecific characters.—Differs markedly from all its races in much darker cinnamon underparts, practically concolor throughout (except for the under tail-coverts) with throat only a trifle lighter; much darker back, Carob to Liver

⁸ Data concerning Type taken from van Rossem’s notes, made in Munich, Aug. 19, 1933. Van Rossem’s measurements of wing and tail are slightly less than those given by Hellmayr, Novit. Zool., Vol. xx, 1913, p. 253, but Hellmayr probably measured wing and tail in a different way. As van Rossem’s method is similar to my own, I am using his figures as giving a better comparison.

⁹ 1913, Hellmayr, Novit. Zool., xx, p. 253.

Brown, with a distinct cinnamon cast; rump practically concolor with back, which is differently colored in the other three races; streaks on upper parts, sides of neck and upper chest darker—Warm Buff to Cinnamon or Rusty. In addition, it differs from all but *melanchima* in short tips to all three pairs of outer rectrices and a long subterminal black bar on the lateral.

Measurements.—4 adults, excluding Type, wing 139.8 mm.; tail 273 mm.¹⁰; exposed culmen 37 mm.¹¹; tarsus 50.7 mm.¹¹; outer anterior toe minus claw 29.6 mm.¹²

Specimens examined.—Five specimens: 1 (the Type) by Adriaan van Rossem, 4 from Vera Cruz by myself.

Range.—Mexico to Vera Cruz. The exact limits of the range of this form cannot be determined until more material is collected from points further south and west.

Remarks.—Whether true *velox* intergrades with *melanchima* or with *affinis* it will be impossible to decide until adequate specimens are secured from eastern Jalisco, Michoacan, Morelos, southern Puebla and southern Vera Cruz.

Geococcyx velox affinis (Hartlaub)

RUSTY ROADRUNNER

Geococcyx affinis HARTLAUB, Rev. Zool., vii, June, 1844, 215 (Guatemala; coll. Bremen Mus.?).

Subspecific characters.—Nearest to *velox velox* in coloration, but under parts generally paler—less cinnamon; throat always whiter; light streaks of upper parts and spots on crown generally whiter; tips of rectrices longer; and subterminal black bar on outer rectrix shorter.

Differs from *melanchima*, in having tips to all three pairs of outer rectrices decidedly longer; subterminal black bar of outer rectrix much shorter—50 per cent; a gray area, similar to that of the outer rectrix, appearing in large blotches on second pair of rectrices; upper back averaging darker in series with bases of feathers, as well as the scapulars, marked with dark green. The relationship of *affinis* to the Honduran form will be discussed under that race.

Measurements.—Eight males from Guatemala, wing 142.8 mm.; tail 276.9 mm.; exposed culmen 37.1 mm.; outer anterior toe minus claw 28.3 mm. Eight females from Guatemala, wing 145.1 mm.; tail 273.2 mm.¹³; exposed culmen 34.9 mm.; outer anterior toe minus claw 28.6 mm. Three males from Salvador, wing 146.4 mm.; tail 267.3 mm.; exposed culmen 38.6 mm.; outer anterior toe minus claw 29.3 mm. Seven females from Salvador, wing 138.2 mm.; tail 266.7 mm.; exposed culmen 36.2 mm.; outer anterior toe minus claw 29.5 mm. Ten adults from Yucutan, chiefly without sex determination, wing 132.4

¹⁰ Three specimens.

¹¹ Three specimens.

¹² For measurements of black and white areas on rectrices, see table at end.

¹³ Four specimens.

mm.; tail 242.2 mm.; exposed culmen 39.4 mm.; outer anterior toe minus claw 28.2 mm.¹⁴

Specimens examined.—Thirty-seven specimens: Guatemala: San Lucas, 1 ♂ and 1 ♀; Sacapulas, 1 ♂; Progreso, 1 ♂ and 1 ♀; Panajachel, 1 ♂ and 2 ♀; Coban, 1 ♂; Finca la Primavera, 1 ♀; Finca Concepcion, 1 ♀; San Antonio, 1 ♀; Guatemala City, 1 spec.; "Guatemala", 3 ♂ and 1 ♀. Salvador: Los Essimeles, 1 ♂ and 2 ♀; near Lake Olomega, 1 ♂ and 2 ♀; Colimes de Tucuaran, 1 ♂; Vol. San Miguel, 1 ♀; Pinne Pealis, 2 ♀. Yucutan: Merida, 2 ♂; Xbac, 1 ♂; Temax, 2; Peto, 2; Izalam, 1; Progreso, 1; "Yucutan," 1 spec.

Range.—Chiefly the Subtropical Zone of Guatemala and Salvador in arid regions, and the upper levels of Tropical Zone. It "never reaches sea-level" in Nicaragua.¹⁵

Remarks.—*Geococcyx affinis* was described by Hartlaub, according to Ridgway, from a specimen secured in Guatemala. No hint is given as to its source, but the specimen is presumably in the Bremen Museum. As the description was published in 1844, it seems a reasonable presumption that the specimen came either from one of the collections of Señor Don José Vicente Constancia or was taken by Delattre, since our records do not reveal any other large collections made prior to 1844. Constancia's headquarters were at Antigua. Most of his birds were probably obtained from an elevation of 5000 to 8000 feet. Delattre maintained headquarters at Coban, whose elevation is "variously given from 3800 to 4356 feet"¹⁶. In either case it is not likely that the Type was secured at an elevation lower than 3000 feet. Of the thirteen collecting stations, cited by Griscom for Guatemala, only two are below 3200 feet and of the seventeen specimens, which I have examined, only two came from an altitude lower than 3200 feet and no bird at all lower than 2000 feet. Practically the same is true of the birds in the Dickey Collection from Salvador; only three of the ten came from below 3000 and none below 1200 feet. On the other hand it ranges as high as 6700 feet in Guatemala and 6400 feet in Salvador. It would seem obvious that *affinis* is largely a Subtropical Zone bird. Salvador specimens average slightly darker on the upper back with the green more pronounced on the bases of the feathers, but are essentially *affinis*.

The birds from Yucutan are somewhat difficult to determine because of inadequate data, as well as the practical absence of material from intermediate areas. They have unusually short tails, tips and black bars close to *affinis*, and considerable individual variability in coloration. Some are quite pale like *melanchima* which would be anticipated in an Arid Tropical Zone bird. They do not have *melanchima's* long black bar on outer rectrix, nor short tips. It is possible they are subspecifically distinct. Until fresh material is collected in Yucutan, it seems best to record them tentatively as *affinis*.

¹⁴ Four specimens. For measurements of black and white areas on rectrices, see table at end.

¹⁵ 1932, Griscom, Bird Life in Guatemala, p. 50.

¹⁶ 1932, Griscom, Bird Life in Guatemala, p. 416.

We should expect intergrades between *affinis* and *melanchima* in Chiapas, but there are no available specimens. Individuals from southwestern Oaxaca near the coast are *melanchima*. Similarly no specimens are available from the large area between the Motagua River of central Guatemala and Teguagalpa in southern Honduras. We should expect intergrades between *affinis* and the Honduran race along the Merendon Mountain Range.

Affinis is a weaker race than any of the others, and, except for tail characters, closer to true *velox*. It is obviously not an intergrade between *melanchima* of the northwest and the Honduran form, since in coloration it is darker buff below than either of them, having its affinities with *velox*. Until the type has been examined critically and more specimens of the latter with full data secured, it seems well to recognize this race.

*Geococcyx velox longisignum*¹⁷ subsp. nov.

BLACK AND WHITE ROADRUNNER

Type.—Male adult; no. 161178, collection of Museum of Comparative Zoölogy; Comayabuela, Honduras; Oct. 1, 1931; collected by C. F. Underwood.

Subspecific characters.—Nearest to *Geococcyx velox affinis* (Hartlaub), but white tips to the three outer rectrices much longer, tips to lateral rectrices merging with light gray area on inner webs and eliminating the black subterminal bar, the gray area slightly longer; gray area on second rectrix much longer and always present; the back darker brown in series; feathers of nape and upper back nearly black, more prominently marked with green at base of feathers, largely concealed; lighter streaks on sides of neck and upper chest whiter (in most specimens pure white); lighter streaks on scapulars, back, nape and spots on crown whiter (generally pure white).

Description of Type.—Adult male in newly moulted plumage nearly completed. Identical with description of Type of *melanchima*, except for the following: Spots of pileum white; hindneck black, the feathers broadly edged with white; upper back and scapulars Mummy to Prout's Brown, the feathers darker basally and marked with green, largely concealed, the margins sharply edged with white or buffy white; wing-coverts broadly edged with pure white, the greater coverts black very broadly tipped with white; proximal secondaries (tertials) brown; other secondaries dull blackish glossed with bronze-greenish, edged (except towards base) with white, the outer web with a terminal spot of the same; alulae dull black medially, broadly margined with white; primary coverts dull black basally; primaries dull black; lower back Clove Brown, each feather with a streak along shaft of Deep Olive, tipped with Cinnamon-Brown; feathers of rump tipped with Ochraceous-Tawny; outer webs of upper tail-coverts deep Brownish Vinaceous, slightly iridescent and glossed with greenish when seen at certain angles, inner webs more greenish and more narrowly edged with white; median rectrices Deep Livid Brown glossed with Purplish Vinaceous and along the shaft with greenish, this shaft-mark broadening toward the tip into

¹⁷ Latin *longus*=long, and *signum*=a mark or banner, referring to the long white tips of the outer rectrices.

glossy Dusky Olive Green; next pair not fully developed, glossy Dusky Olive Green and with a white terminal spot about 10 mm. long; next pair of the same color; the next pair a slightly darker glossy green; lateral rectrices dusky Slate Olive on the inner web, Olivaceous Black along the shaft of outer web, bordered broadly by white on outer web, more narrowly on the inner, without any subterminal black bar; the tips of three outer pairs (beginning with lateral rectrices) measuring 49 mm.; 42 mm.; and 21.4 mm.; under parts Light Buff, touched here and there with Warm Buff, paler on abdomen, almost pure white on chin and throat; sides of neck and sides of chest broadly streaked with black, the black streaks broadly margined with an equally wide streak of pure white; under tail-coverts dusky tipped with Russet; maxilla dull horn color, mandible mostly dull yellowish or grayish in dried skin.

Remarks.—This southern race is the extreme form of the elimination of the rusty tones and the tendency to replace them with dark brown, black and white. It differs markedly in coloration from true *velox*, being largely black and white where *velox* is cinnamon and buff. It resembles *melanchima* in the tendency toward white spots on the crown and white on the throat and streaks of the sides of the neck, but it differs from both of these northern forms in all of the characters mentioned under "*subspecific characters*" above. Both *velox* and *melanchima* have long subterminal black bars on the outer rectrices, whereas *longisignum* has none. Most of the specimens I examined from Honduras and Nicaragua come from altitudes between 3000 and 3200 feet and the altitude of the remainder I have not determined. Apparently it does not reach sea level.

Measurements.—Seven males from Honduras, wing 143 mm.; tail 278 mm.; exposed culmen 39.6 mm.; outer anterior toe minus claw 29.2 mm. Six males from Nicaragua, wing 145.3 mm.; tail 279.7 mm.; exposed culmen 38.7 mm.; outer anterior toe minus claw 31.3 mm. Three females from Nicaragua, wing 140.1 mm.; tail 268.8 mm.¹⁸; exposed culmen 36.6 mm.; outer anterior toe minus claw 30.6 mm.¹⁹

Specimens examined.—Seventeen specimens: Honduras: Comayabuela, 4 ♂ and 1 spec. without sex indication; Mount Redondo, 3 ♂. Nicaragua: Ocotal, 2 ♂; Matagalpa, 2 ♂ and 2 ♀; near Matagalpa, 1 ♂; San Rafael del Norte, 1 ♂ and 1 ♀.

Range.—Honduras and Nicaragua.

General remarks.—The races of *velox* as a whole are subject to considerable individual variation in certain items of body coloration—width of stripes on sides of neck and amount of spotting on crowns—but the changes in amounts of black and white on the rectrices show surprisingly little variability and serve as excellent characters. In general, northern birds, both true *velox* and *melanchima*, have small white tips, short gray areas and very large black subterminal bars on outer rectrices, whereas

¹⁸ One specimen.

¹⁹ For measurements of black and white areas on rectrices, see table at end.

southern races have the white and gray areas greatly increased in size, the black subterminal bar on the outer rectrix reduced fifty per cent in *affinis* and disappearing in *longisignum*. In *longisignum* we have a great enlargement of the gray area on inner webs of second pair of rectrices from the outside (see measurements in table). This appears in every one of my fifteen specimens from Honduras and Nicaragua²⁰, and is very conspicuous in eleven of them. On the other hand, it is entirely absent in seven specimens of *affinis*, prominent in six and vestigial in three. Unfortunately, I did not notice this character, when I was examining the specimens in eastern museums of *velox* and *melanchima*, but of the four specimens that are before me, one of *velox* and two of *melanchima* do not possess it and a third one of the latter has only a very small streak on one feather. I think further examination will prove it practically absent from northern races.

Of the fifteen specimens examined of *longisignum*, the subterminal black bar of outer rectrix is absent or vestigial in all except one—no. 161176, Museum of Comparative Zoölogy, from Monte Redondo, Honduras. By contrast, not one of the sixteen specimens of *affinis* from Guatemala, which I have examined for this character, are without the black bar and only one of ten specimens of *affinis* from Salvador lacks it.

Griscom has shown²¹ that the Lesser Roadrunner of Guatemala is one of several typical species of the desert interior valleys that "could only have emigrated from farther north or have descended from the lower levels of what is now the Arid Temperate Zone." He has also shown that the arrival of the Glacial Epoch was a factor of extreme importance in Guatemalan bird life and that the increased refrigeration drove the birds from the then Subtropical Zone down to sea level and that subsequently the close of the Ice Age reversed the movement and the Subtropical Zone was gradually recaptured by such individuals as had survived at the lower levels. It is probable that *Geococcyx velox*, was such a species, and that the upward movement from sea level conditions has not yet ceased. Whether it ever reached the coast in Nicaragua, Honduras, Guatemala and Salvador or was stopped by humid coastal tree-growth, it is no longer at sea level today and could not endure the heavy growth which seems to cover the coasts of these countries. Van Rossem assures me such is the

²⁰ In American Museum specimen no. 102775, one outer rectrix appears not to have this gray area. This is an illusion, as the feather has been completely twisted around, the real under side of the feather now being on top.

²¹ 1932, Griscom, Bird Life in Guatemala, p. 50.

condition in Salvador, but that the bird is found in stony grasslands twenty-five miles from the sea at an altitude of 1200 feet. It is now found at sea level only in the northwest, and in the peculiar isolated Arid Fauna of Yucutan. It also comes close to the coast in extreme southwestern Oaxaca and probably at other points between Oaxaca and Sinaloa. It does not seem to be a common bird anywhere at sea level. Dr. Gaumer stated it is rather rare in northern Yucutan, except at Rio Lagartos, and Stone met with it only near Tekanto. Although specimens have been collected in Mazatlan, Sinaloa, the experience of two veteran collectors during the past year, J. T. Wright and C. C. Lamb, proves that it is not by any means common. Therefore, it seems reasonable to say that this species was formerly a Subtropical or Arid Temperate bird, that its excursion to sea level was a forced one, that its new environment has not been altogether agreeable; that at least one race which still remains there in diminished numbers, *melanchima*, has acquired a pallid coloration. This last cannot be said of lower level birds of Central America, which, perhaps because of additional climatic factors, are not uniform in this respect.

AVERAGE MEASUREMENTS OF TAIL CHARACTERS IN *Geococcyx velox*

	Length Tip Lat. Rec. 1	Length Black Bar Lat. Rec. 2	Length Gray Lat. Rec. 1	Length Tip 2nd Rec. from Outside 1	Length Gray 2nd Rec. 1	Length Tip 3rd Rec. 1
MALES						
4 from Vera Cruz (<i>velox velox</i>)	35.6	18.3	103.63	27.7	0.03	14.35
8 from Son., Sin., Col., Jal., and Oaxaca (<i>melanchima</i>)	34.7	20.7	112.13	27.9	17.24	15.4
10 from Guatemala & Salvador (<i>affinis</i>)	37.17	9.98	114.36	32.28	37.96	18.1
4 from Yucutan (no sex) (prob. <i>affinis</i>)	38.4	6.6		32.4		17.3
13 from Honduras & Nicaragua (<i>longisignum</i>)	42.9	1.6	117.27	37.810	75.6	23.29
FEMALES						
6 from Sin., Tepic & Oaxaca (<i>melanchima</i>)	33.6	18.6	110.95	28.2	0.05	15.2
15 from Guatemala & Salvador (<i>affinis</i>)	35.1	11.7	115.411	31.8	46.312	18.012
3 from Nicaragua (<i>longisignum</i>)	37.4	4.9	122.33	31.6	37.13	17.2

1.—Greatest length parallel with shaft.

2.—Length along shaft.

3.—One specimen.

4.—One specimen—Average of 2 lateral rectrices. A very narrow broken streak on only 1 rectrix.

5.—Two specimens.

6.—Three specimens.

7.—Eight specimens.

8.—Nine specimens.

9.—Ten specimens.

10.—Eleven specimens.

11.—Twelve specimens.

12.—Thirteen specimens.

